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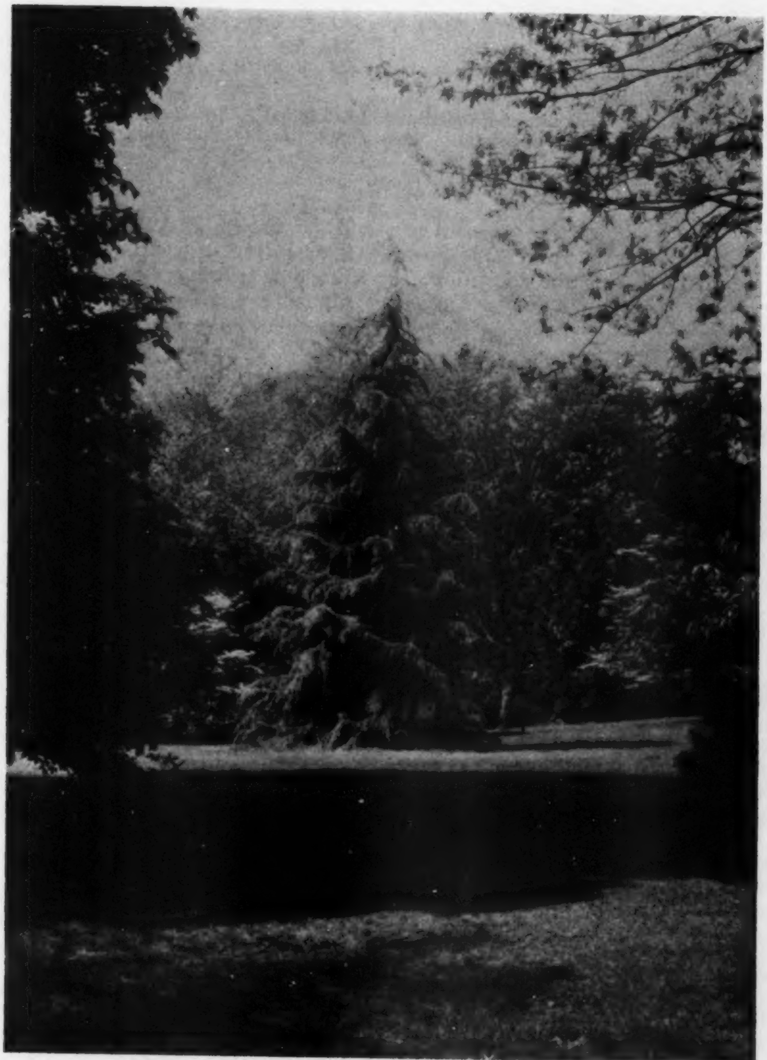

Fig. 24. Deodar *(Cedrus deodara)* at the Morris Arboretum.

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THE DEODAR

The true Cedars are among the noblest and most picturesque trees. There are four species in the genus *Cedrus,* differing in habit but only slightly on morphological grounds. Thus some authors consider them as geographical forms of the same species. However, as they occur in widely separated areas and are readily recognizable as distinct, it is preferable to regard them as species.

The Cedar of Lebanon, *Cedrus libani,* is the most famous of them all. This majestic tree is native to the ancient biblical land, and well known for its scriptural and historical associations. A photograph of this tree growing at the Arboretum appeared as the frontispiece of the July, 1939, number of the Morris Arboretum Bulletin (Vol. 2, No. 16). On the nearby island of Cyprus in the eastern Mediterranean is the little known Cyprus Cedar, *Cedrus brevifolia,* closely related to the Cedar of Lebanon and often regarded as a mere variety. In the Atlas Mountains in northern Africa grows the Atlas Cedar, *Cedrus atlantica,* a photograph of which formed the frontispiece of Vol. 2, No. 14, January, 1939. The fourth species, the Deodar, *Cedrus deodara,* occurs at high altitudes through the western Himalayas.

These majestic trees are widely grown as ornamentals. All species, except the Cyprus Cedar, are represented in the living collections of the Morris Arboretum by well developed specimens. Atlas Cedar is dependably hardy in the Philadelphia region, as is the Sargent strain of Lebanon Cedar. But only an occasional individual of Deodar survives. Of the Cyprus Cedar little is known in this area.

The Deodar is undoubtedly the most elegant and decorative of the true cedars. The tree is pyramidal in outline, especially when young. The branches and branchlets as well as the leader are drooping or strongly declined. It is thus easily distinguished from the other species, which have more or less erect leading shoots and stiff branchlets. The dark green needle-like leaves of the Deodar, averaging 1-1½ or sometimes to 2 inches in length, are also longer than those in the other species. These slender leaves together with the pendant branches give the tree a much more graceful appearance than the other species.

The tree is widely distributed throughout the western Himalayas from Afghanistan to Garhwal. It grows at 4,000-10,000 feet elevation, where it is the most important conifer. It thrives in various habitats but the best forests are found where the rainfall ranges from 40 to 70 inches. In its native habitat the tree grows up to 250

(continued on page fifty-nine)

A REEXAMINATION OF PLANT LABEL PROBLEMS, WITH SOME NEW DESIGNS

J. R. Schramm

(Continued from page 43)

II. LABELS NOT FOR ATTACHMENT TO TREE TRUNKS

A. Hanging Label for Shrubs and Small Trees

In most collections of woody plants, especially if they contain much flowering material, shrubs predominate numerically. To the shrubs may well be added small trees, small either inherently or because of youth, since they present essentially the same problems in labeling. It is likely, therefore, that in most collections the label adopted for these classes of plants will require production in greatest numbers. In evolving the design described below, this fact has been kept in mind.

The assembly (Fig. 25) consists of two parts, the label proper and the hanging band, the material in both being highly rust-resistant stainless steel.

The label, of sheet steel 0.015" thick and 1½" wide, is embossed in 3/16" letters on a 5-line machine of the type commonly used for making conventional zinc labels. Details of fabrication will appear in the appendix. But here it may be pointed out that the label, already quite stiff by virtue of the thickness and temper of the metal, acquires considerable added stiffness as a result of embossing. This quality is highly desirable.

To ready the embossed label for hanging, it is provided at the mid-line with two punched slots near the upper and lower edges respectively. The hanging band is fashioned from a strip of sheet steel 3/4" wide and .005" thick. By folding over and flattening each margin of the strip (Fig. 26 at A) the original sharp sheared edges are eliminated, the new edges being velvety smooth. At the same time the band acquires considerable added resistance to lateral bending while retaining its ribbon-like pliability in the other direction.

Hanging the Label. — Attaching the label to the plant is depicted in Fig. 26, with a, b, and c successive preliminary stages in the process. The size of the hanging loop should be liberal to permit very free swinging of the label. This allows for growth of the branch. But it also permits gravity to keep the label horizontal at all times, making for easy reading and tidy appearance. Additional allowance is advisable if substantial growth and permanence is expected in the limb or branch to which the label is attached. In the latter case, provision can also be made (at the time of the initial hanging) for one later enlargement of the loop without resort to a new band. Additional band length can be provided by coiling the excess at the free end (at D in Fig. 26).

Performance. — The first installations at the Morris Arboretum were made 15 years ago, since which time the number has grown to many hundreds. Performance has been uniformly satisfactory, indeed excellent.

Aside from the permanence of the labels, being subject to no corrosion or other deterioration, the design has certain advantages which merit special comment.

Fig. 25. Design of hanging label for shrubs and small trees. For details see Fig. 26.

(a) *Visibility and Readability.* — The labels are bright — permanently so. At first it was feared that this might be objectionable. Actually it has proved advantageous. One of the minor exasperations of the otherwise rewarding experience of examining collections is the difficulty of finding and reading the labels, especially where embossed zinc, copper or other metals are used which darken by oxidation.

resulting in the death of the twig from that point outward. No injury has ever been detected under the hanging band, even when in full direct sunlight.

As already pointed out, all surfaces of the band coming in contact with the twig or branch are smooth. Though swinging freely, the subtending branch is never abraded. What little pressure the weight of the label exerts on the branch is widely distributed by the band. When wire is used this weight is concentrated along the narrow line where the wire rests on the branch, sometimes resulting in transverse grooving or other minor injury.

(b) *Horizontal Position.* — In almost all types of shrub labels the inscription is oriented vertically, the label being suspended from one end. In the present design suspension is effected by a metal band attached to the mid region with the result that the inscription is kept in horizontal position, thus facilitating reading.

(c) *Absence of Injury to Plants.* — The hanging band, being light in color, reflects much of the incident light. Consequently it does not heat up as does blackened (oxidized) copper wire. The latter in direct sunlight may get hot enough to kill the adjacent tissues, at times

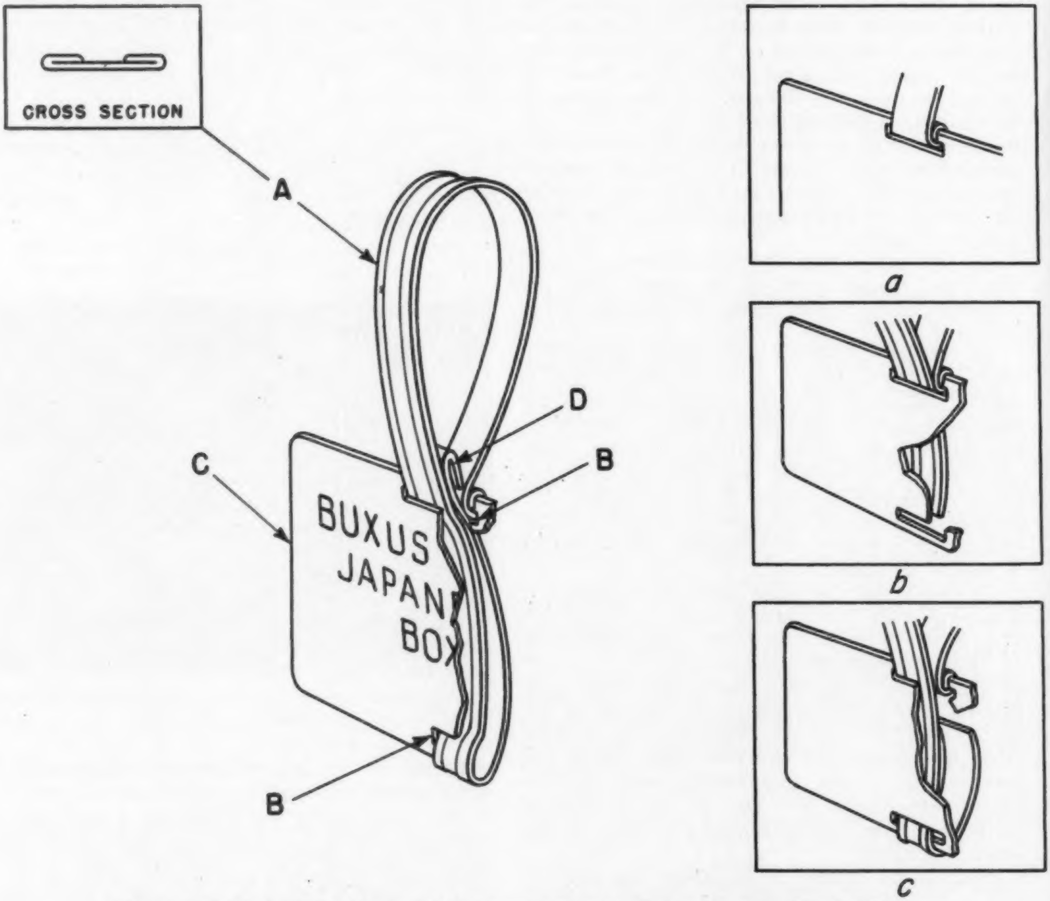

Fig. 26. Details of all-stainless steel label for shrubs and small trees.—C, embossed label, provided with punched slots at B and B through which is threaded hanging band A (shown at left in cross section). a, initial anchoring of band in upper slot; b and c, successive stages in threading the band through the slots and forming the hanging loop. End of band shown at D, where excess length is coiled if provision for future enlargement of loop is made at time of initial hanging.—*Drawing Courtesy of H. L. Yoh Company, Inc., Philadelphia, Pa.*

(d) *Susceptibility to Tampering.* — In the very nature of the case, shrub labels are within easy reach — of young and old alike. Removal by methods short of cutting the metal or severing the branch is much less easily accomplished in the present design than in labels with conventional twisted wire attachment. It is possible though difficult and laborious to unthread a hanging band without the aid of tools. That a few labels may thus have been mischievously removed at the Arboretum is, of course, possible; if so it has not come to our attention. But there is clear evidence that removal by twisting, apparently the source of more satisfaction, has been attempted. The stiff label gives the culprit a good grip. However, the band is so tough and so firmly anchored to the label that it does not give way. Here again some attempts may have been crowned with success, but if so we have not become aware of them. By reversing the twist the band, while kinked, is restored intact to full functional order. In all these cases the labels, put under considerable strain when used as the grip for twisting the band, emerged without mutilation.

(e) *Accession Numbering.* — It will be noted from Fig. 25 that the accession number of the plant to which the label is to be attached is not embossed on the label. Instead, the number is written on the reverse side in lead pencil. (As already noted (p. 42), a lead pencil record on the stainless steel is totally unaffected by weather.) By this procedure it is not necessary to preempt a line on the label for the accession number, in which the visiting public has no interest. Also, if through death or removal of the plant the label is freed, it can be reused on another plant of the same identity by merely erasing the former accession number and substituting the new, again in pencil. All labels temporarily out of circulation can, after removal of the bands, be filed alphabetically in card-index fashion, ready for reuse as occasion arises.* So handled, the labels are in fact perpetual. And putting the removed bands through a tinner's roller restores them to practically their original condition, and certainly to full usefulness. For all practical purposes the bands, too, are perpetual.

B. Removable Standard Label

The labels so far discussed require attachment to the plant. There remain some types of woody plants and certain situations in which attachment is either impractical or educationally ineffective, or both. Among these are ground cover plants (ivies, etc.); very dense and compact shrubs and small trees, notably certain conifers — including many dwarf forms; plants which are pruned back drastically every year, e. g., tea roses; etc. And in herbaceous plants, with which we are here not directly concerned, plant-attached label types are essentially useless.

In such situations recourse is inevitably to a standard inserted in the ground, to which the label is attached or of which it is an integral part. In view of the impressive number of standard labeling devices in use, many of them attractive and commercially available, proposing yet another will doubtless appear superfluous. If we nevertheless do so, it is because existing types lack one or two features which would be welcome if they could be incorporated in a practical way.

The brief general discussion of desirable features in labels appearing in the first installment of the present series (p. 36) is largely pertinent here. But aside from these, standard labels present certain special problems which merit comment.

(a) Unless firmly anchored in the ground, standard labels are notoriously vulnerable to removal and accidental or prankish interchanging. On the other hand, in certain situations anchoring in turn complicates maintenance (grass cutting, etc.).

(b) Standard labels are prone to become askew, leaning in this direction and that, and requiring frequent adjustment if collections are not to be marred by inebriate guides. How the standard is set in the ground rather than the type of label is usually responsible for this difficulty. However, if the standard is of metal and not sufficiently rigid, bending becomes an added factor. But even if the standard is rigid and so set that it effectively resists lateral displacement, there remains the necessity of anchoring, at least in collections at all exposed to mischief and vandalism. But anchoring, as already noted, in turn creates difficulties in certain situations.

It appears, then, that in addition to long life, acceptable appearance and educational effectiveness, immunity to leaning, secure anchoring, and easy and quick removability would be desirable features. As for removability, it is obvious, however, that the mechanism making this possible must be sufficiently cryptic to baffle those bent on mischief or worse. The following design represents an attempt to incorporate these more or less conflicting requirements in a standard label.

*Though the labels vary in length depending on the inscription, the width ($1\frac{1}{2}$") is uniform. The top of the label file is therefore even as in a conventional card file, and easily consulted. If the file becomes extensive, index tabs can be added to facilitate use.

Fig. 27. Design of removable standard label in position: left, in rose bed; center, among ground cover plants; right, in lawn. For details see Fig. 28.

Fig. 27 shows the label in position, with Fig. 28 depicting the assembly in some detail. Essentially the device consists of two parts: (a) an above-ground square standard with engraved label, both of black locust wood, fitted at its turned base into (b) an underground stainless steel tube which is so equipped that it becomes firmly anchored and braced as it is buried in the ground. These two parts are joined into a single assembly by an automatic locking device concealed beneath the ground level. By means of an appropriate key operated with precision from above ground, the locking mechanism is made to release the wood standard with its label. When grass cutting, repairs, or other operations are completed, the standard is reinserted in the buried tube, locking itself automatically.

Details of the device are given in Fig. 28 and its legend, and a discussion of fabrication will appear in the appendix. A few items, however, call for comment here.

It will be noted that the actual articulation of the removable standard and the tube buried in the ground is effected by the telescoping of two stainless steel tubes, with appropriate clearance. If the turned base of the wood standard (3 in Fig. 28) were inserted directly into the buried tube (5 in Fig. 28), the inevitable swelling of the former would result in binding, thus interfering with removal.

By providing the turned base with a stainless steel sleeve (4 in Fig. 28) the swelling is contained. Experimental tests with such assemblies submerged in water for weeks followed immediately by long freezing at low temperatures demonstrated that the tubular sleeve neither bursts nor is it perceptibly stretched or deformed

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Fig. 28. Removable standard label: on left, "exploded" view showing details of design; on right, assembled unit in place, with releasing key in operating position.

1, black locust wood label block. 2, square locust wood standard with beveled top and turned base (3). 4, sleeve of stainless steel tubing fitting on turned base 3. 5, stainless steel tubing anchored and braced in soil and telescoping at its upper end on sleeve 4. 6 and 7, screw holes for fastening label block to beveled face of standard with stainless steel screws 8.

10, 11, and 12, the stainless steel locking mechanism consisting of a tube (10) in which are inserted in order the compression spring (11) and the plunger (12), the last seated in the spring. This locking assembly slides into hole 9 drilled through turned spindle 3. When sleeve 4 slides into position on spindle 3, the locking assembly is held in place by the outer shoulder of the plunger resting against inner face of sleeve 4 but with outer turned end of plunger projecting through and beyond hole 13 (drilled through only one side of sleeve 4). By depressing plunger projecting through hole 13, tube 5 telescopes onto sleeve 4, the plunger automatically engaging hole 14 when opposite it and locking the entire assembly into one unit.

16, locust wood block threaded on tube 5 and held in place at base of tube by rustless nail 18 inserted in hole 17 drilled through tube. 15, locust bracing block threaded on tube 5 and tamped into place just below locking plunger 12.

20, releasing key, with pins 21 engaging guide holes 19 in wood standard, thus automatically bringing releasing pin 22 directly opposite locking plunger 12. By slightly rocking top of key away from standard, the locking plunger is depressed, releasing the label. Sharp tip and edges of portion of key penetrating the soil insures easy operation of key. When reinserting label, plunger 12 is depressed manually to allow tube 5 to retelescope on sleeve 4. Locking is automatic when slight rotation of label brings locking plunger 12 opposite hole 14.

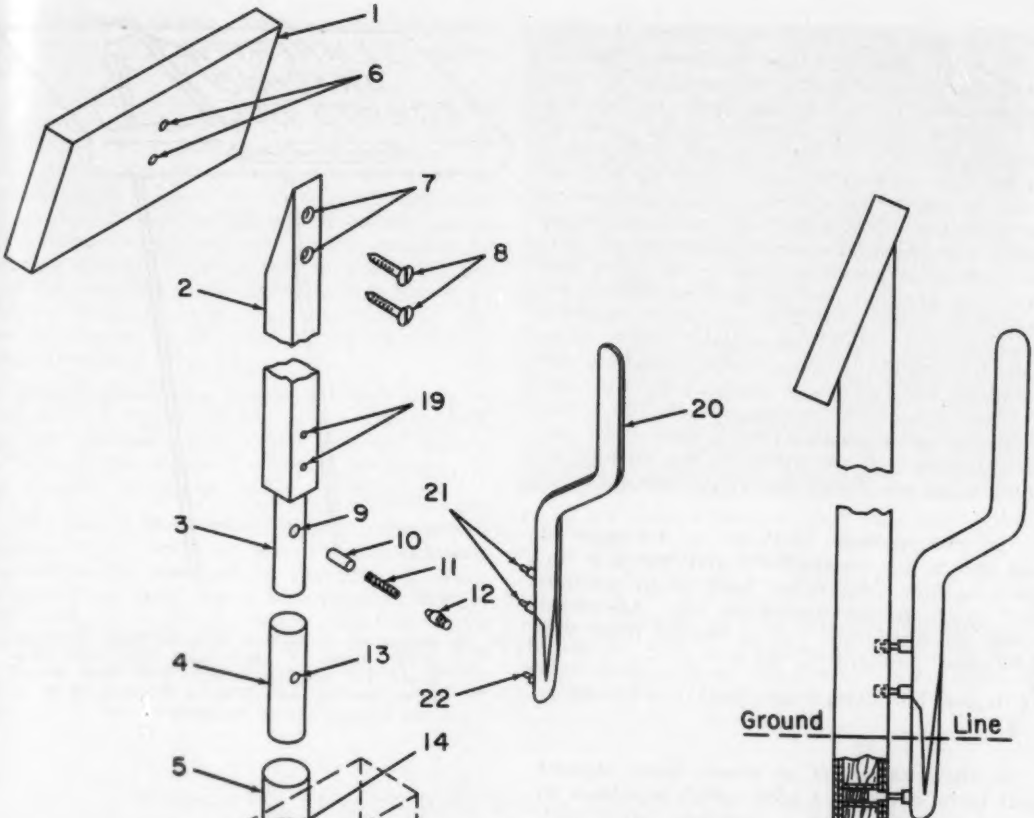

Fig. 28

by the combined forces of swelling and freezing.

In burying the soil tube, the lower block of black locust wood acts as the anchor, the soil being tamped around and above it. As the filling and tamping proceed, the upper (bracing) block is threaded on the tube at a level as high as possible to give maximum bracing without however interfering with the locking mechanism or operation of the releasing key. This bracing block presents a substantial surface to the soil on each of its sides and ends, — ample to prevent any movement of the tube in the soil by lateral pressure applied to the wood standard above ground. The entire assembly thus remains soberly vertical. If brute force is used on the standard, the latter will break at the soil line (where the turned base begins) rather than displace the underground complement. The anchoring block in turn thwarts any attempt to pull the entire device out of the ground.

Interchangeability of Parts. — All parts of the device are standardized and therefore interchangeable. All holes, both as to position and direction, are drilled on jigs. Assembled units are thus made up as needed from prefabricated standardized parts.

C. Label For Greenhouse, Rock Garden, etc., Plants

In these categories of plants there appears still to be need for a label which is subject to no deterioration and is therefore permanent. For woody plants in the greenhouse on which plant-attached labels are practical, the all-stainless steel hanging label already described answers the requirements. But aside from these, some sort of standard label seems unavoidable.

The design (Fig. 29) here submitted was developed for the extensive collection of subtropical and tropical plants, mostly potted, in the greenhouses of the Department of Botany, University of Pennsylvania. Like the one for shrubs, the label is of stainless steel throughout. Similarly, the embossing of the inscription is done in the same way — with a 5-line machine on .015" steel strips 1½" wide. However, the maximum number of lines of embossed inscription is four. By centering the inscription on the strip, blank metal remains at the top and bottom which is provided with punched holes and then bent back at 90° angles so that the finished label takes the form of a very rigid channel. Through the four holes a preformed rectangular U of stainless steel rod is threaded from below, the two free ends being bent down where they emerge at the top of the label to form a two-pronged standard for insertion in the ground.

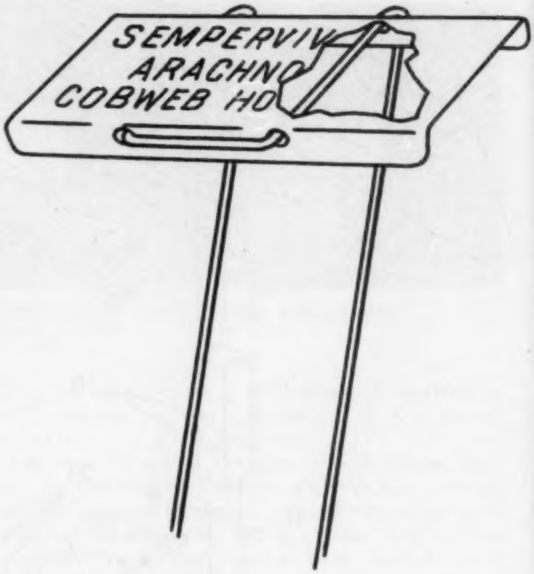

Fig. 29. Design of all-stainless steel standard label for potted plants, etc., with label tilted away from plant (for modification with label tilted toward plant, see Fig. 30).—*Drawing Courtesy of H. L. Yoh Company, Inc., Philadelphia, Pa.*

Several thousands of these labels have now been in use in greenhouses for 16 years, where they are subjected to especially severe test as regards corrosion. Not a single case of rusting or other deterioration has occurred. If the wire standards become badly bent or twisted, as has happened in a few cases either accidentally or by design, they can easily be replaced. But no instance of damage to the label itself has come to our attention. It may fairly be considered perpetual. If with year-in and year-out watering with city water the surface finally becomes dulled with mineral deposit, scouring powder restores it to its original condition almost instantly.

If the plants being labeled are carried under accession numbers, the latter are conveniently recorded in lead pencil on the back of the label. As already noted for the hanging label, such records on the stainless steel are completely

weatherproof, though easily removed with rubber eraser if the label is to be used on another plant with the same identity.

The design is such that the label is projected outward from the plant rather than toward it (Fig. 29). This makes for better visibility and readability, the label being less likely to be concealed by foliage; also, it interferes less with maintenance of potted plants. If for any reason it is desired to tilt the label in the opposite direction, this can be done very simply by threading the standard in the opposite direction, i. e., beginning at the top, with the bend in the prongs coming at the base of the label rather than at the top (Fig. 30).

Besides greenhouse plants, the labels are in use to some extent also out of doors — on rock garden, aquatic, and a few bedding plants. Wherever the standard needs to be longer, as in aquatics, a heavier, stiffer rod is used.

The uses of the present design — for potted plants, etc., — are such that it is not practical to anchor the standard in the ground. Consequently our label shares with previous designs the weakness that it is easily pulled out. An anchoring device could be added; but even if it were it would at best be a deterrent rather than a preventive. Those bent on mischief or worse would have no great difficulty in removing the labels. And in doing so the injury to the potted plant may be more serious than loss of the label.

Fig. 30. All stainless steel standard label for potted plants, etc., with label tilted toward plant. For details see Fig. 29.

(The concluding Appendix, giving detailed information on materials and fabrication of the labels described, will appear in a later issue.)

THE MICHAUX QUERCETUM

This long range undertaking represents a joint effort of the Morris Arboretum of the University of Pennsylvania and the Northeastern Forest Experiment Station of the Forest Service, U. S. Department of Agriculture. It is financed in part by the Michaux Fund of the American Philosophical Society.

With the generous cooperation of many agencies and individual botanists and foresters, there will be established at the Morris Arboretum in Philadelphia a comprehensive living collection of all species and varieties of oaks adapted to the climate. The collection will constitute a memorial to François André Michaux, the noted French botanist and early student of American forest trees, notably oaks. On his death in 1855, Michaux bequeathed a fund to the American Philosophical Society, Held in Philadelphia for Promoting Useful Knowledge. By the terms of the bequest, the income is to be used for furthering the progress of forestry and agriculture in the United States. It is from this Fund that the Society is financing the present undertaking in part.

Every effort will be made to proceed in such manner that over the years the Quercetum will have the maximum practicable of usefulness in theorectical and applied research. More specifically, it will provide the materials and facilities for research on the following problems among others:

Breeding — The establishment of an authenticated collection of oak species (native and exotic) at the Morris Arboretum will provide the germ plasm for breeding, and particularly for extensive hybridization, with this most important hardwood genus.

Taxonomy. — The oaks are a very complex and taxonomically confused group. Approximately 80 species with some 20 varieties, and several hundred presumed natural hybrids, have been described from the United States alone. The studies outlined below should contribute substantially to delineating and establishing the validity of species.

Progeny Tests. — These tests will provide information on variation within oak species and some light on the existence and distribution of oak races.

Tests of Exotic Species. — The project will provide preliminary tests of exotic species from all temperate oak-inhabiting parts of the northern hemisphere.

General Plan

The starting point in every case will be about 100 seeds each from individual wild trees geographically pin-pointed in wild natural stands, in every instance accompanied by herbarium specimens from the same tree whence came the acorns. The numerous presumed natural hybrids will be excluded, not because they are not interesting but because they would have less scientific usefulness while at the same time enlarging the undertaking to unmanageable proportions. Especially in species of wide distribution extending into diverse physiographic areas or climatic zones, separate seed and herbarium collections will be obtained from as many of these areas and zones as practicable. And in the same locality, collaborators are asked to make if possible separate collections from two trees. This will provide the minimum replication necessary to indicate the possible existence of races within the species.

The seedlings will be maintained in the seed bed for one year and in the nursery up to four years. During this time the progeny from each collection will be intensively studied, including critical attention to variability and any evidence of hybridity. Single-tree progenies showing significant variability or great deviation from the parental type, will be rejected and new seed obtained. Only from those single-tree seed lots which yield progenies true to type and not significantly variable* will a few individuals be transplanted when five years old to the permanent Quercetum. Every effort will be made to place the excess seedlings in collections which will likewise serve the above objectives.

The plants in the final Quercetum should thus represent an unusually authentic documented collection of oak species and germ plasm, available for research to all qualified investigators. More immediately, the seedling population studies will yield information and publications of value.

Procedure

Active work began in the spring of 1953. In this first year of operation, efforts were confined to temperate North America in order both to get under way promptly and to gain experience. Many agencies and individual botanists and foresters have been invited to collaborate in the

*If all the seeds of any single-tree collection were first generation hybrids with a single male parent, the resulting plants would be expected also to be very uniform. This, however, is a remote possibility in a wild population.

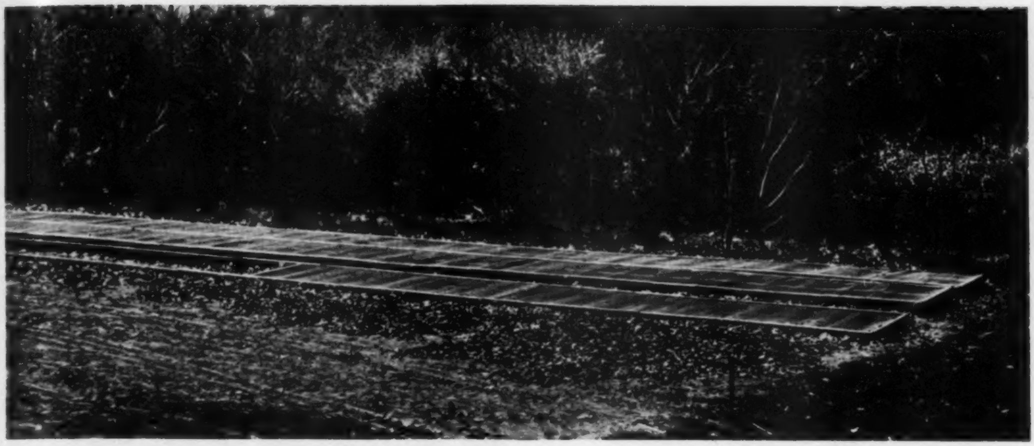

Fig. 31. Rodent-proof oak seed beds in winter condition.

all important initial task of securing the necessary seeds and herbarium specimens in accordance with the procedures adopted. The response has been very generous.

By the end of the first season (1953), 29 botanists and personnel of the U. S. Forest Service had sent in a total of 150 separate seed collections representing 37 species and 23 states. Because of weevil infestation of acorns or the erratic or periodic fruiting pattern of numerous oak species, many additional collaborators were unable to make suitable collections in 1953. They will continue their efforts in subsequent seasons. At the conclusion of the present account are listed all who have already contributed material, together with some data on the collections.

To assist the collaborators in their work, each is furnished suggestions on collecting procedure and supplied with certain materials to facilitate collecting and forwarding. A list of these suggestions and materials is likewise appended.

From each individual seed lot received, about five acorns and cupules are removed, individually numbered in ink with the collection number, and filed in the herbarium. The herbarium specimen, taken by the collector from the same individual tree from which the acorns are collected, is likewise incorporated in the herbarium.

The remaining acorns, in most cases about 100 in number, are planted immediately upon receipt in specially constructed rodent-proof seed beds (Figs. 31, 32). To prevent the development of deep tap roots, the seed bed is underlain by flyscreen wire cloth 9 inches below the surface. This facilitates transplanting of the seedlings to the nursery and reduces losses.

During the year in the seedbed as well as subsequently in the nursery, the seedling populations, as already indicated, will be studied intensively. And by scheduling transfer to the nursery for the second spring, hardiness data will be secured while the populations are still in the seedbed.

In 1954 collecting in temperate North America will continue. At the same time activity will be extended to Europe, the Near East, and to certain parts of the temperate Orient. And in the years to come the area of collecting will be further enlarged as conditions permit.

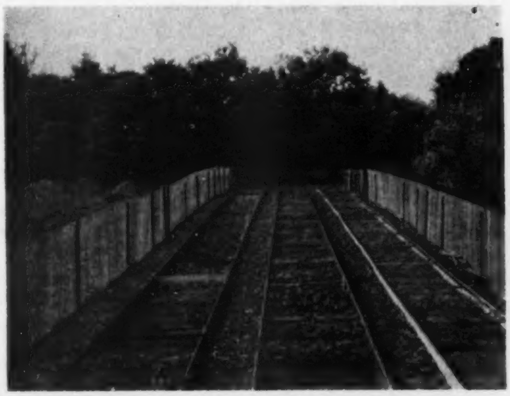

Fig. 32. Oak seed beds spring of 1954, showing seedlings. Hardware cloth (1/4" mesh) which in first winter serves as rodent-proof top, subsequently functions as rabbit-proof enclosure.

Individuals and Institutions Contributing Collections in the 1953 Season*

Ahles, Harry E., University of Illinois
Q. alba, Pulaski Co., Ill.
Q. bicolor, Pulaski Co., Ill.
Q. borealis maxima, Madison, Pope & Richland Co., Ill.
Q. falcata, Williamson Co., Ill.
Q. imbricaria, Madison Co., Ill.
Q. marilandica, Pope Co., Ill.
Q. palustris, Cumberland Co., Ill.
Q. shumardii, Richland Co., Ill.
Q. stellata, Cumberland Co., Ill.
Q. velutina, Cumberland, Johnson & Pulaski Co., Ill.

Anderson, D. A., Texas Forest Service
Collected by B. Zobel
Q. lyrata, Houston Co., Tex.
Q. marilandica, Harrison Co., Tex.
Collected by B. Zobel & R. Richard
Q. alba, Montgomery Co., Tex.
Q. cinerea, Houston Co., Tex.

Baldwin, Henry I., Fox State Forest, New Hampshire
Q. borealis, Hillsborough Co., N. H.
Q. borealis maxima, Hillsborough Co., N. H.

Baldwin, J. T. Jr., College of William and Mary
Q. spp., James City, Princess Anne, Warwick, Williamsburg, & York Co., Va.

Balls, E. K. (See under P. A. Munz.)

Bolton, R. T. (See under H. I. Baldwin.)

Everett, P. C. (See under P. A. Munz.)

Goddard, R. (See under D. A. Anderson.)

Gates, Frank C., Kansas State College
Q. borealis or var. *maxima*, Pottawatomie & Riley Co., Kans.
Q. macrocarpa, Pottawatomie & Riley Co., Kans.
Q. marilandica, Pottawatomie Co., Kans.
Q. muhlenbergii, Riley Co., Kans.
Q. prinoides, Riley Co., Kans.

Hansen, H. P., Oregon State College
Collected by R. M. Marvin
Q. garryana, Yakima Co., Oreg.

Hatmaker, Allen (See under E. G. Wiesehuegal.)

Hatmaker, J. T. (See under E. G. Wiesehuegal.)

Kriebel, Howard B., Ohio Agricultural Experiment Station
Q. imbricaria, Wayne Co., Ohio
Q. palustris, Wayne Co., Ohio
Q. prinus, Wayne Co., Ohio

Leeson, William M., West Virginia University
Q. ilicifolia, Mineral Co., W. Va.

Marvin, R. M. (See under H. P. Hansen.)

Massey, A. B., Virginia Polytechnic Institute
Q. spp., Virginia

Morley, Thomas, University of Minnesota
Q. ellipsoidalis, Dakota Co., Minn.
Q. velutina, Goodhue Co., Minn.

Muller, C. H., University of California, Santa Barbara College
Q. agrifolia, Santa Barbara Co., Calif.
Q. douglasii, Santa Barbara Co., Calif.
Q. dumosa, Santa Barbara Co., Calif.
Q. durata, Santa Barbara Co., Calif.
Q. lobata, Santa Barbara Co., Calif.

Munz, Philip A., Rancho Santa Ana Botanical Garden
Collected by E. K. Balls & P. C. Everett
Q. agrifolia, Ventura Co., Calif.
Q. chrysolepis. Shasta Co., Calif.
Q. douglasii, San Luis Obispo Co., Calif.
Q. garryana, Trinity Co., Calif.
Q. kelloggii, Monterey Co., Calif.
Q. lobata, Napa Co., Calif.
Q. wizlizenii ? frutescens, Napa Co., Calif.

Olson, Jerry S., Connecticut Agricultural Experiment Station
Q. coccinea, North Carolina

Richard, R. (See under D. A. Anderson.)

Shanks, Royal, University of Tennessee
Q. alba, Knox Co., Tenn.
Q. borealis, Haywood Co.. N. C.
Q. shumardii, Knox Co., Tenn.
Q. shumardii schneckii, Knox Co., Tenn.

Small, John A., New Jersey College for Women
Q. borealis, Somerset Co., N. J.
Q. falcata, Ocean Co., N. J.
Q. ilicifolia, Ocean Co., N. J.
Q. marilandica, Ocean Co., N. J.
Q. ilicifolia, Ocean Co., N. J.

Taylor, C. A., South Dakota State College
Q. macrocarpa, Brookings Co., S. Dak.

Tucker, J. M., University of California, Davis
Q. agrifolia, Napa Co., Calif.
Q. dumosa, Napa Co., Calif.
Q. durata, Napa Co., Calif.
Q. wizlizenii, Napa Co.. Calif.

U. S. Department of Agriculture, Forest Service

Central States Forest Experiment Station
Collected by L. S. Minckler & G. Deitschman
Q. borealis, Hardin Co., Ill.
Q. coccinea, Hardin Co., Ill.

Intermountain Forest & Range Experiment Station
Collected by W. J. McGinnis
Q. gambellii, Sanpete Co., Utah

Lake States Forest Experiment Station
Collected by C. L. Arnold
Q. alba, Cass Co., Mich.
Collected by R. N. Smith
Q. velutina, Clinton Co., Mich.

Northeastern Forest Experiment Station
Collected by E. J. Schreiner & J. W. Wright
Q. borealis, Delaware Co., Penn.

Pacific Northwest Forest & Range Experiment Station
Collected by G. L. Hayes
Q. kelloggii, Josephine Co., Oreg.

Rocky Mountain Forest & Range Experiment Station
Collected by H. E. Brown
Q. gambellii, Delta Co., Colo.
Collected by D. R. Cable
Q. gambellii, Gila Co., Ariz.
Q. grisea, Gila Co., Ariz.
Q. turbinella, Gila Co., Ariz.

Southern Forest Experiment Station
Collected by J. S. McKnight
Q. lyrata, Tallahatchie Co., Miss.
Q. nigra, Washington Co., Miss.
Q. nuttallii, Washington Co., Miss.
Q. phellos, Tallahatchie Co., Miss.
Q. shumardii, Tallahatchie Co., Miss.
Collected by R. Schoembe & J. Lewis
Q. coccinea, Jefferson Co., Ala.

*Because of weevil infestation of 1953 acorn crop in certain species or regions and absence of fruiting in others, many additional collaborators were unable to make suitable collections in 1953. They will continue their efforts in subsequent seasons.

Q. falcata, Ashley Co., Ark.
Q. laurifolia, Ashley Co., Ark.
Q. lyrata, Ashley Co., Ark.
Q. marilandica, Ashley Co., Ark.
Q. nigra, Ashley Co., Ark.
Q. phellos, Ashley Co., Ark.
Q. stellata, Ashley Co., Ark.
Collected by W. D. Smith
Q. stellata, Boone Co., Ark.
Collected by H. A. Yocom
Q. coccinea, Jefferson Co., Ark.
Q. falcata, Jefferson Co., Ark.
Q. velutina, Jefferson Co., Ark.
West, Erdman, Florida Agricultural Experiment Station
Q. chapmanii. Marion Co., Fla.
Q. laurifolia, Alachua Co., Fla.
Q. myrtifolia, Marion Co., Fla.
Q. shumardii, Alachua Co., Fla.
Q. stellata, Putnam Co.. Fla.
Q. virginiana, Alachua Co., Fla.
Wood, Carol Jr., University of North Carolina
Q. velutina, Orange Co., N. C.
Wiesehuegal, E. G., Tennessee Valley Authority
Q. borealis, Anderson Co., Tenn.
Collected by Allen Hatmaker & J. T. Hatmaker
Q. stellata, Bledsoe Co., Tenn.
Collected by J. T. Hatmaker
Q. coccinea, Anderson Co., Tenn.
Q. stellata, Bledsoe, Co., Tenn.
Q. velutina, Anderson Co., Tenn.
Zobel, B. (See under D. A. Anderson.)

Suggestions for Collaborators

A. Collecting Procedure

For each species or variety, collect:

I. *From a single wild tree in natural woodland*:
(a) 100-125 acorns as soon as ripe, and 6-12 cupules;
(b) a typical leafy branch (if possible with a few cupules attached) for use as an herbarium specimen.

It is basically important that all the acorns, cupules and the specimen *unquestionably come from the same individual tree.* Usually this can best be assured if the items are collected from a tree with low fruiting branches on the edge of a woodland.

Avoid trees which might possibly have been planted, also any which are suspected of being hybrid.

Reject acorns which show any sign of weevil infestation; acorns dropping early are often very heavily weeviled.

II. *From another tree in the same locality* make if possible a second collection exactly as outlined in I above, keeping it as an *entirely distinct and separately numbered collection from the first one.*

B. Materials Furnished to Collaborators, and Mailing Procedure

For each collection (individual tree), the following are furnished:
1 polyethylene bag with sealer
1 self-addressed cloth bag
1 numbered stainless steel tree tag with copper nail
1 numbered collector's field label
2 numbered string paper tags

All numbered articles for a single collection are in one envelope and bear the same number.

Attach to the tree the tag with the enclosed copper nail; do not drive nail deeper than the cambium (to forestall overgrowing).

Attach one of the numbered string tags securely to the herbarium specimen.

Fill out the collector's field label; on the reverse side of the label, give if possible directions sufficiently precise to relocate the tree if this should prove desirable in the future.

Put the acorns, together with the second numbered string tag, into the polyethylene bag; seal the bag by twisting the sealer tightly.

Put the sealed polyethylene bag, *together with the filled out field label,* into the self-addressed cloth bag for *immediate mailing;* the seeds of some oaks lose viability quickly.

The herbarium specimen, after drying in an ordinary herbarium press, or under pressure between newspapers, can be mailed separately at a later date in the large self addressed envelope. In pressing, turn some leaves to show the underside.

Collaborators furnishing collections from more than one species in a season will find it convenient to mail all herbarium specimens at one time in the addressed envelope provided.

J. R. Schramm, *Director,*
Morris Arboretum of the University of Pennsylvania

Ernst J. Schreiner, *Forest Geneticist,*
Northeastern Forest Experiment Station,
U. S. Forest Service

AKEBIA AS A WEED IN THE PHILADELPHIA AREA

H. L. Li

Akebia is a genus of long trailing woody vines native to eastern Asia. The leaves are long-petiolate and digitately compound (Fig.32), and are deciduous or half evergreen. Because of the slender growth and the graceful habit, as well as the elegant tender-green foliage, these vines are desirable ornamentals. In the spring they produce two kinds of dark purplish flowers, male and female, borne on the same raceme. The flowers are not conspicuous, but have a pleasing fragrance. The fruits, very large fleshy pods to nearly 8 cm. long, are at first green, later becoming purple; they are rarely produced in cultivation.

There are two species in the genus, *A. quinata* and *A. trifoliata,* both in cultivation. The first has five leaflets, the latter three. *A. quinata* is the more handsome and also is hardier. Both species are adapted for climbing on trellises or trees. Because of their slender stems they are more suitable for small modern houses and gardens than are the more familiar woody vines such as Wisteria and Trumpet-Creeper.

In their native haunts in China and Japan, these vines grow at low to medium altitudes in thickets and ravines and on mountain sides. While sometimes quite common, they never become exceedingly abundant.

Recently it was observed that *A. quinata* grows very luxuriantly at "Crosswicks," the former Clement B. Newbold estate at Jenkintown near Philadelphia which for a number of years has been reverting to an essentially wild state. Apparently originally planted, the species has spread vigorously. By 1953 it had covered an area of several acres, forming an almost pure stand in the form of a dense tangled mat covering the ground and overrunning all shrubbery and trees in its path. In the process it has choked out all herbaceous vegetation and killed many of the shrubs and trees it has overrun.

The vines flower freely and produce fruits in considerable quantity. Seedlings are abundant.

Fig. 33. *Akebia quinata* as an aggressive weed in the Philadelphia region.

The plant has apparently quite established itself and is able to spread aggressively under present conditions. On the grounds of the Pennsylvania School of Horticulture at Ambler near Philadelphia, Akebia, when not carefully controlled, also tends to spread as a weed.

It thus seems that *Akebia quinata,* left to itself, can become a serious pest in the Philadelphia region, reminiscent of Japanese Honey Suckle, *Lonicera japonica.* However, it will be much easier to control as the exceedingly large fruits are most conspicuous and easily removed. Moreover, there is no possibility of seed dispersal by birds, which in the honey suckle makes control so hopeless a problem.

THE DEODAR

(continued from page forty-six)

feet in height. At old age it forms, like the other cedars, a flat, spreading top.

Deodar is the tenderest of all the well known true cedars. Aside from the one noted below, all specimens planted at the Morris Arboretum in the past, while surviving the milder winters, have perished in severe ones. The one exception appears as frontispiece (fig. 24). This stately individual, fully justifying the claim that Deodar is the most graceful of all conifers, was planted in 1937 as a seedling received from Mrs. Barnes from the University of Washington Arboretum. It has proved hardy through the years without the slightest sign of winter damage and now (May 21, 1954) measures 32.5 feet in height and 8.1 inches in diameter at breast height (12.3 inches near ground level), with a spread of the lower branches of 19.4 feet. It bears male cones in abundance but no female cones have yet been observed.

This individual tree obviously possesses superior hardiness for our climate. It is therefore being propagated vegetatively by grafting on Atlas Cedar seedlings as understock, the latter reliably hardy in this general region.

The cedars are admirably suited for growing as specimen trees on lawns, provided there is ample space for development. Their stateliness adds charm to any garden. They should be planted when not more than 4 - 6 feet high, and prefer a deep, loamy soil, well drained but moist.

H. L. Li

INDEX TO VOLUME V — MORRIS ARBORETUM BULLETIN

Nos. 1-4, inclusive (1950-1954)